

PLANT NOVELTIES IN *LEPIDIUM* (CRUCIFERAE) AND *ARTEMISIA* (COMPOSITAE) FROM THE UNTA BASIN, UTAH

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ABSTRACT.—Named as new taxa are *Lepidium huberi* Welsh & Goodrich, sp. nov., and *Artemisia nova* A. Nels. var. *duchesnica* Welsh & Goodrich, var. nov. The taxa are provided with diagnoses and descriptions, and their relationships, provenance, and habitats are discussed.

Key words: *Lepidium huberi*, *Artemisia nova* var. *duchesnica*, new taxa, Utah, Uinta Basin.

Noted historic pioneer Utah botanist Marcus Eugene Jones (1852–1934) has been quoted, perhaps apocryphally, as saying that he felt sorry for all future generations of botanists because so few plants remained for them to describe and name. Whether the quote is true or not, the generations beyond Jones' time have not suffered from a shortage of areas of botanical inquiry, including the discovery and naming of scores of plants new to science, and there are indications that future generations of botanists beyond the 1990s will continue to find and describe novelties. The flora is not yet fully understood.

The Uinta Basin harbors numerous narrow endemics in many genera of plants, due in some part to the availability of unique geological substrates. Geomorphological processes have, through time, exposed geological strata of varying and diverse composition around the periphery of the basin and onto the slopes of mountains and plateaus that form its borders. The basin proper is the result of uplift during and following the Laramide Revolution, which resulted in a topographically low area south of the Uinta Mountains and north of the Tavaputs Plateau. The exposed strata vary in age from the present into the remote Precambrian epoch. Revealed are mud and siltstones, shales, sandstones, limestones, and quartzites of enormous total thickness, each displayed in sequence like pages from a book. Some of the strata, especially the shales and mud and siltstones, weather into fine-textured, salt-laden substrates, others into sand and gravel, and still others into platy shales. Each of the substrates presents a different array of texture, salinity,

trace elements, and other features important to plant growth. Plants have become adapted to the peculiarities of salt content or its lack, to textural differences, and to the peculiarities of water relationships. During the past several millions of years formations have been exposed and cut by erosional processes, and during that same period floras have developed. Varying attributes of the resulting erosional surfaces have allowed the evolution of present floras of the basin. Some Uinta Basin plant endemics are directly correlated to geological formations and are aligned along the strike of formations as though planted mechanically by some gigantic drill. In others the correlation is more subtle, but most endemics show some affinity to particular formations.

The present paper deals with two more narrowly restricted Uinta Basin endemics. Both of them have been known in collections since the 1980s.

Lepidium huberi Welsh & Goodrich, sp. nov.

Similis *Lepidio montano* var. *alyssoides* in habitu generali amplitudine sed foliis praecipue caulinis (foliis basalibus nullis vel evolutis debiliter) in basim lignosam et in siliculam amplitudinam differt.

Plants subshrubs, the stems woody at the base, ashy or brownish, 1–2.5 dm long; branches puberulent throughout, green, 15–53 cm long; leaves all cauline, the eophylls reduced, principal lower leaves 2–3.5 cm long, 8–20 mm wide, pinnatifid, 5- to 7-lobed, the lobes often again lobed or dentate, smaller and entire upwards; panicles 3–10 (14) cm long, branches

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corymbosely arranged; pedicels 2–4.5 mm long, puberulent; sepals glabrous, 1.4–1.9 mm long, oval, green, the margin white; petals white, 2.3–2.6 mm long, 1.8–2.2 mm wide, shallowly incised, the style 0.4–0.8 mm long (Fig. 1).

Suffrutices, caules lignei ad basin, cinerei vel brunneis, 1–2.5 dm long; rami puberulenti omnino, virides, 15–53 cm longi; folia totus caulinis, cophyllis reductis, principalibus infernis foliis 2–3.5 cm longis et 8–20 mm latis, pinnatifidis, 5- to 7-lobatis, lobi plerumque lobati vel dentati, parvaseens et integra sursum; paniculae 3–10 (14) cm longae, ramis corymbose dispositis; pedicelli 2–4.5 mm longi, puberulenti; sepala glabra, 1.4–1.9 mm longa, ovales, virides, marginibus latis albis; petala alba 2.3–2.6 mm long, unquibus 1 mm longis; staminalis filamenti glabra; siliculae glabrae, ovatae vel ovales, ca 2.3–2.6 mm longae, 1.8–2.2 mm latae, incisura vadosa, stylis 0.4–0.8 mm longi.

TYPE:—USA: Utah: Uintah County, growing under ledges of Park City (Phosphoria) Formation, above Weber Sandstone, T2S, R21E, S15 NE1/4, Big Brush Creek Gorge, Uinta Mountains, adjacent to black sagebrush/grass community, west exposure, at 2179 m elev., A. Huber 2400, 18 August 1994 (Holotype BRY; isotypes to be distributed). Additional collections: USA: Utah: Uintah County, 8 km N of Maeser, at base of Taylor Mountain, S. Goodrich, 1548, 13 August 1973; do, T1S, R20E, S30, Ashley Creek, drainage N of Sims Peak, 30 km N of Vernal, at 2959 m, D. Atwood 9128a, 30 July 1982; do, T2S, R21E, S34, SW/SW, N side of Red Mts., ca 16 km N of Vernal, at ca 2320 m, J. Tuhy 2693, 31 July 1986; T2S, R21E, S14 NW/SW, Big Brush Creek Gorge, A. Huber 858, 13 June 1994; do, A. Huber 880, 14 June 1994; do, T3S, R21E, S34, SW/SW, N slope of Red Mountain, ca 6.5 km NW of Steinaker Reservoir, A. Huber & S. Goodrich 2390, 18 Aug. 1994; do, T3S, R21E, S3 NE1/4, Red Mt., ca 6 km NW of Steinaker Reservoir, A. Huber & S. Goodrich, 2392, 18 Aug. 1994; do, T2S, R21E, S34 SW/SE, Red Mt., ca 6 km NW of Steinaker Reservoir, A. Huber & S. Goodrich 2393, 18 August 1994 (all BRY, with numerous duplicates to be distributed).

There is a collection, apparently of this, taken from Moffat County, CO (R. C. & K. W. Rollins 8387, off county roads 13 and 789, S of

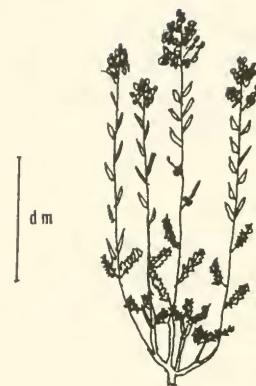
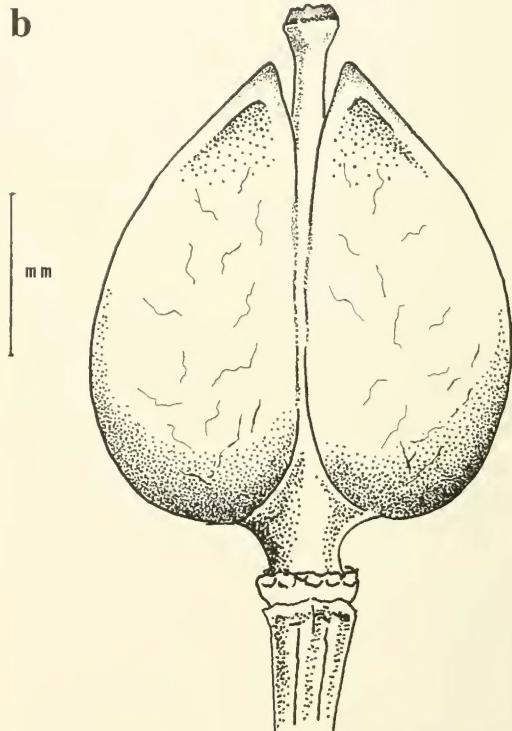
a**b**

Fig. 1. Habit sketch (a) and silicle (b) of *Lepidium huberi* Welsh & Goodrich.

Hamilton), at BRY. Its main difference is the merely toothed unlobed leaves. Pinnately lobed leaves are featured prominently in the material from the range of the species in Uintah County.

The following key will serve to distinguish *L. huberi* from other members of the *L. montanum* complex.

1. Plants slightly if at all woody above the base, biennial to perennial herbs; silicles 2.8–4.1 mm long, 2.1–2.5 mm wide *L. montanum* sens. lat.
- Plants woody well above the base, long-lived perennial subshrubs; silicles various 2
- 2(1). Silicles 4.5–7.5 mm long, 5.2–6.5, obovate; plants of the Mohave desert region of SW Utah and southward *L. fremontii*
- Silicles 2.3–2.6 mm long, 1.8–2.2 mm wide; plants montane, in Uintah County, Utah. *L. huberi*

This taxon, a definite subshrub, differs from *L. montanum* Nutt. sens. lat. in about the same degree and manner that the Mohavaean desert *L. fremontii* Wats. differs from that species complex, i.e., in degree of woodiness and in size of the silicles, which in *L. fremontii* are on the large size for that complex and in *L. huberi* are smaller. Members of the *montanum* complex are widely distributed in the American West and occur in an array of morphological races, many of which are geographically or edaphically correlated. Hitchcock (1936) treated 13 infraspecific taxa, some of which are now regarded at specific rank. The phase of the *L. montanum* complex that is apparently most closely allied to montane *L. huberi* is the extralimital var. *alyssoides* (Gray) Jones, to which early collections of this novelty were assigned. That variety, which ranges widely from Colorado to New Mexico, Arizona, and Texas, sometimes has a branching subligneus caudex, but is seldom if ever subshrubby, and lacks the other morphological features of *L. huberi*. The spatially and elevationally isolated var. *spathulatum* (Robinson) C. L. Hitchc., also an ally, is rather common in Uintah County and elsewhere in eastern Utah. It is a tall plant, apparently biennial or short-lived perennial, with a single stem from the base, the caudex not woody or much branched. It is most common at low elevations along drainages, growing with sagebrush. Most phases within the *montanum* complex have been regarded at specific rank in the past, and there is more than marginal justification for so treating them in the future. Justification for regarding *L. huberi* at specific rank involves its combination of morphological characters, i.e., long-lived perennial habit, ligneus base, deeply lobed lower cauline leaves, and small silicles.

Lepidium huberi grows in sand or silty sands derived from formations of various age

from the Shinarump Member of the Chinle, Park City, and Weber Sandstone, all on the south-plunging flank of the Uinta Mountains. It occurs in black sagebrush, mountain brush, ponderosa pine, lodgepole pine, and spruce-fir communities at 2225 to 2960 m elevation.

Artemisia nova A. Nels. var. *duchesnicola* Welsh & Goodrich, var. nov.

Persimilis *Artemisia nova* A. Nels. in magnitudine et habitu sed in foliis pilis albis dense non-glanduliferis et in floribus generatiter 5 (raro 4) et bracteis plus numerosis (10–20, nec 8–12) differt (Fig. 2).

Shrubs, 1–3 (5) dm tall, main branches spreading, vegetative stems 1–3 dm long (rarely more); flowering stems mainly 1.5–3 (4) dm long; leaves dimorphic, 0.3–2 cm long, those of old stems shallowly to deeply 3- to 5-lobed or -toothed, lobes or teeth rounded, cuneate basally, appressed white canescent and not punctate; inflorescence narrowly paniculate, seldom more than 3 cm wide; involucres 3.1–5.8 mm long, 1.4–3.4 mm wide, cylindric to narrowly campanulate; bracts 10–20,

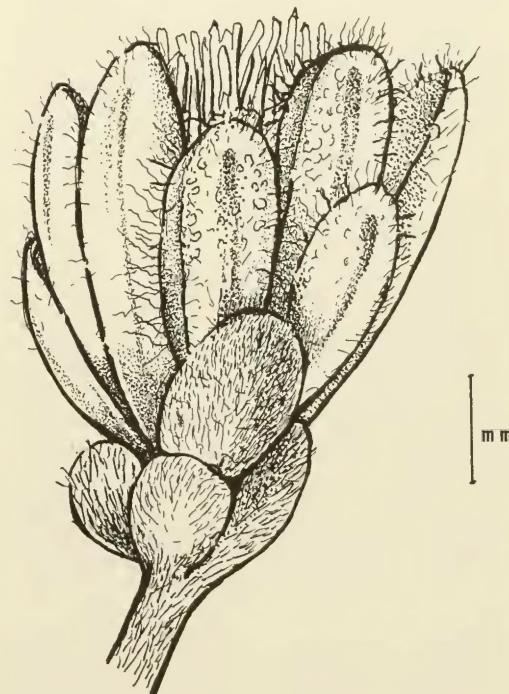


Fig. 2. Drawing of floral head of *Artemisia nova* A. Nels. var. *duchesnicola* Welsh & Goodrich.

white canescent, the margin hyaline; flowers 5 (rarely 4), all perfect; receptacle glabrous; achenes glabrous.

TYPE.—USA: Utah: Uintah County, T5S R20E S5 NE1/4, 16 km W of Vernal, 1710 m elevation, desert shrub community, on heavy, reddish clay of the Duchesne River Formation, S. Goodrich 23215, 17 Sept. 1990 (holotype BRY; isotypes to be distributed).

ADDITIONAL SPECIMENS.—USA: Utah: Uintah County, T5S R19E NW 1/4 S2, along Hwy 121, 3 km E of Lapoint, 1740 m elevation, Neese et al. 11013, 19 Sept. 1981; do, T5S R19E S2, 3 km NE of Lapoint, along Hwy 121, 1665 m, on red silty clay of the Duchesne River Formation, S. Goodrich 22225, 5 Sept. 1986; do, T1N R1E S26 SE1/4 USM, 0.6 km SE of Tridell, 1720 m, heavy clay of the Duchesne River Formation, S. Goodrich 23212, 17 Sept. 1990; do, T5S R19E S2 NW1/4, 3 km E of Lapoint, 1720 m elevation, on heavy, reddish clay of the Duchesne River Formation, S. Goodrich 23214, 17 Sept. 1990; do, T3S R19E S35 E1/2 SLM, about 1.4 km N of Hwy 121 between Lapoint and Maeser, red clays of Duchesne River Formation, 1800 m elevation, S. Goodrich 23255, 27 Sept. 1990 (all BRY, with numerous duplicates to be distributed).

This taxon differs from typical *A. nova* A. Nels. in the densely white pubescent outer involucral bracts and generally denser pubescence of leaves and flowering stalks, and in the lack of conspicuous glandular dots on leaves. Leaves are not the green to lead-gray color typical of most populations of var. *nova*, most of which also have glandular dots. There are, however, a few known populations of var. *nova* that lack glandular dots, but they possess the lead-gray to green color. In var. *duchesnicola*, the dense white, or silvery, pubescence of leaves that lack glands is diagnostic. Additionally, mature involucres of var. *duchesnicola* are less lustrous, the number of involucral bracts is greater on the average (8–12 in var. *nova*, 10–20 in var. *duchesnicola*), and the flower number is almost uniformly 5 (not 3–8 as in var. *nova*). Practically all other features of the variety proposed herein are similar to var. *nova*.

The proposed new variety would key in Welsh et al. (1993) to *A. arbuscula* Nutt. From

that species var. *duschesnicola* can be distinguished by its relatively shorter flowering stems, uniformly three-lobed vegetative leaves, much larger number of involucral bracts (10–20, not 4–8), and uniformly 5-flowered heads (not 4–9).

The following key, modified from Welsh et al. (1993) will aid in identification of this taxon and its near allies.

1. Inflorescence open-panicle, commonly more than 2 cm wide; plants often more than 5 dm tall *A. tridentata* var. *wyomingensis*
- Inflorescence narrowly paniculate, commonly less than 2 cm wide; plants usually less than 5 dm tall 2
- 2(1). Plants commonly 3–5 dm tall (sometimes taller); involucral bracts 4–8 *A. arbuscula*
- Plants commonly 3 dm tall or less; involucral bracts averaging more than 8 3
- 3(2). Vestiture of plants silvery white; involucral bracts 10–20 *A. nova* var. *duchesnicola*
- Vestiture of plants mainly lead-gray; involucral bracts 8–12 *A. nova* var. *nova*

The var. *duchesnicola* is the dominant plant, often in association with other desert shrubs, on reddish clay soils of the Duchesne River Formation, for which the variety is named, from about 15 km west of Vernal to Tridell. It occurs from about 1700 to 1800 m elevation on low clay uplands in a position ecologically between *A. tridentata* var. *wyomingensis* (Beetle & Young) Welsh of desert drainages and *A. nova* var. *nova*, which grows in rocky substrates formed by ancient stream pediments. Suggested as the origin of this entity is potential hybridization of *A. nova* and *A. tridentata* var. *wyomingensis*. Although differing only in minor ways, the plants are continuous and uniform over rather large expanses of the Duchesne River Formation, and they are worthy of taxonomic recognition.

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